

**A new endogaec ground beetle from eastern Spain:
Typhlocharis gonzaloi sp. n. (Coleoptera: Carabidae: Anillini)**

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A new endogaec ground beetle from eastern Spain: *Typhlocharis gonzaloi* sp. n. (Coleoptera: Carabidae: Anillini). - Based on specimens captured in B-horizon calcareous soils the new species *Typhlocharis gonzaloi* sp. n. (type locality: La Heredad, Pego, Alicante Province, Spain) is described and its morphological features compared with the features of members of the *T. diecki*-group, to which it is assigned.

Keywords: Coleoptera - Carabidae - Trechinae - Anillini - *Typhlocharis gonzaloi* sp. n. - Alicante - Spain - Iberian Peninsula.

INTRODUCTION

Entomological surveys conducted in the tropics or on remote islands and high mountains routinely discover previously undescribed species. Discovery of new species is unexpected in surveys of regions with long-studies faunas, unless the study concentrates on habitats that have not been thoroughly investigated previously. Endogaec habitats are in the latter category, and so it is that such a survey, in Alicante Province, Spain, yielded specimens of a previously unknown species of the Anillini genus *Typhlocharis* Dieck, 1869 that was readily placed in the *T. diecki*-group. The purpose of this paper is to make known this species, and to place it in a suitable taxonomic context. The members of *T. diecki*-group are recognized by the following combination of structural features (Zaballos & Ruiz-Tapiador, 1997): clypeus with apical margin truncated, edentate, elytron with umbilicate series of setigerous punctures in 4 + 3 formula, with one or two apical dentiform projections. The distribution of this group includes several mountains in Spain and North Africa, and comprises the following six species (Fig. 8): *T. diecki* Ehlers, 1883 (North Spain: Navarra and Zaragoza, see Zaballos, 1986); *T. santschii* Normand, 1916 (Northeast Tunisia: Sahel); *T. besucheti* Vigna Taglianti, 1972 (South Spain: Sierra Nevada); *T. carmenae* Zaballos & Ruiz-Tapiador, 1995 (Central Spain: Montes de Toledo); *T. farinosae* Zaballos & Ruiz-Tapiador, 1997 (Central Spain: Montes de Toledo); and *T. gonzaloi* sp. n. (Eastern Spain: Alicante) (see below).

Anillini carabids are residents of deep leaf litter, upper soil layers and caves. For a general treatment of the group, see Jeannel (1937, 1963). The genus *Typhlocharis* is a member of the worldwide-distributed Anillini complex, comprising therein the monogeneric Mediterranean *Typhlocharis* phyletic series (Jeannel, 1963: 80-83). *Typhlocharis* Dieck, 1869 is a large genus, including 39 species only well known from the western Mediterranean region. In the Iberian Peninsula 37 species contribute to this genus (Serrano, 2003) and two other species are known only from North Africa (Normand, 1916; Zaballos & Ortuño, 1988).

MATERIAL AND METHODS

The two known specimens were collected using the Normand method (Normand, 1911) and later the Berlese method (Berlese, 1905) on samples of B-horizon calcareous soil from a talus slope near a stream flowing through a small Mediterranean forest.

First examinations of the anatomical structure were made in a watchglass with Scheerpeltz's solution under a stereomicroscope. After examination, the specimens were included in Hoyer's solution and put on over microscope slide. The most detailed analysis was made using a microscope with a drawing tube. All measurements of the specimens have been made using a calibrated ocular grid set in a microscope. The female genitalia were not dissected but were instead observed by transparency. Finally, the specimens were preserved in an acetate sheet included in dimethyl hydantoin formaldehyde (DMHF).

Typhlocharis gonzaloi sp. n.

Figs 1-7

Type Series. HOLOTYPE: 1 female, La Heredad, Pego (Alicante-Spain), 200 m, UTM: 30SYJ50, 6-IV-1998, V.M. Ortuño leg. (collection of V.M. Ortuño in the Dept. of Zoology and Physical Anthropology, Alcalá University, Spain). PARATYPE: 1 female, same data as holotype (collection of the Muséum d'histoire naturelle Genève, Switzerland).

Diagnosis. With character states of the *T. diecki*-group, adults of *T. gonzaloi* sp. n. are recognized by the following combination of morphological features: elytron with one dentiform projection apical near apex of carina, and elytral disk without a large pit (see comparison with *T. carmenae*, in text); metathoracic leg with trochanter pyriform and femur clavate; genital shield with gonocoxite IX robust, with two long apical nematiform setae and one ensiform seta medially; spermatheca spherical.

Description. With character states of the *T. diecki*-group and those specified in the diagnosis above, and the following:

Habitus as in Fig. 1. Integument pale, without dark pigment. Length: 1.19 - 1.20 mm. Dorsal surface with mesh pattern isodiametric, microlines distinctly impressed (microsculpture), and with sparse covering of short setae.

Head (Fig. 1). In outline, lenticular, width 0.28 mm, slightly narrower than pronotum. Eyes absent (anophthalmous species). Antennae short, in backfolded position, extended approximately to base of elytra, antennomere 1 sparsely setose; antennomeres 2-11 densely setose; only antennomeres 4-10 moniliform. Labrum transverse, rectangular, anterior margin truncate. Mandible with acute incisor tooth. Maxilla, including palpomere, average for Anillini. Labium (Fig. 2) with complete

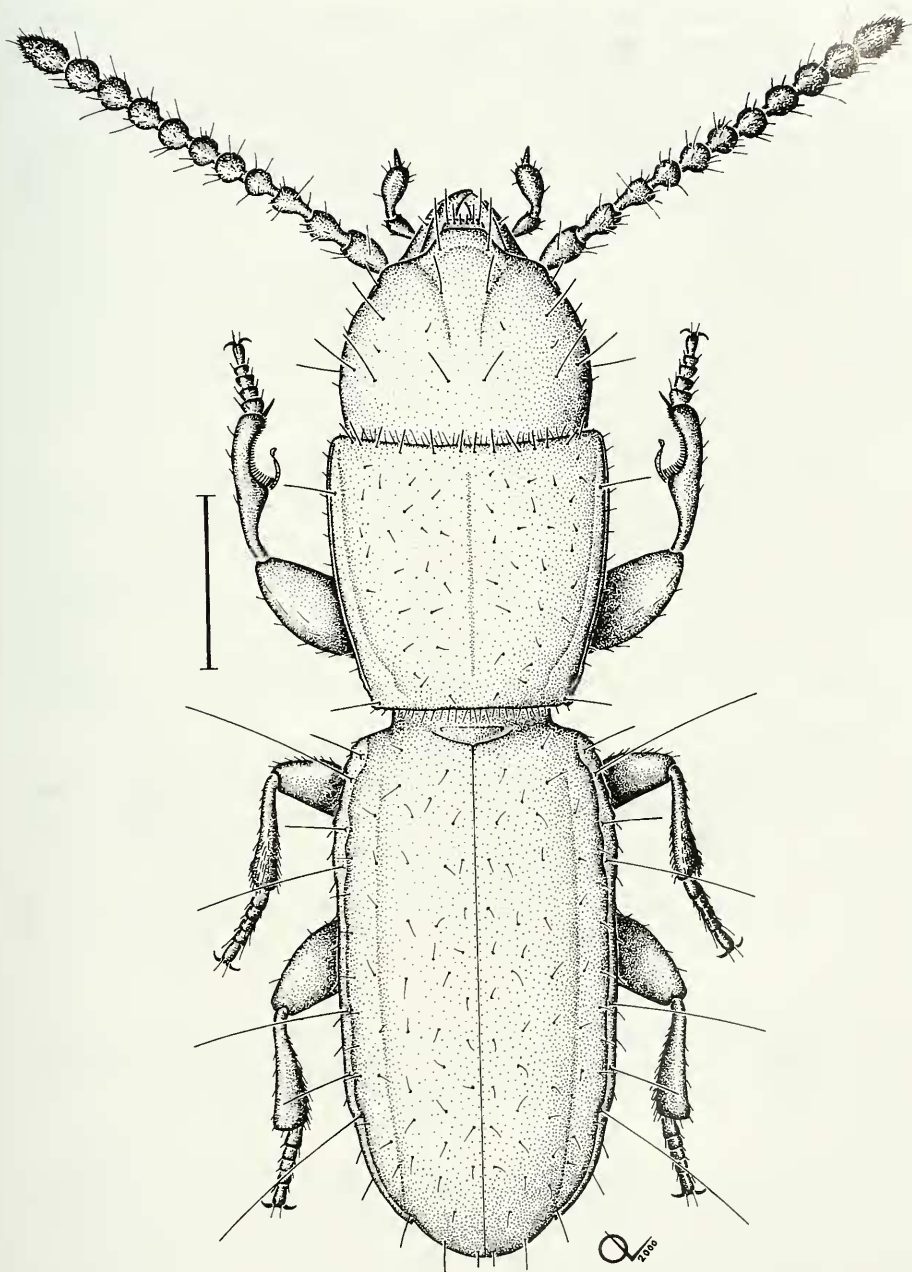


FIG. 1

Habitus of *Typhlocharis gonzaloi* sp. n., female (Scale: 0.2 mm).

labial-prebasilar suture, labium with apical margin shallowly notched, lateral lobe each side with apex narrowly obtuse, and tooth short, apex narrowly obtuse. Labial and maxillary palpomeres typical of genus. *Cephalic chaetotaxy*: clypeus with one pair of setae; head capsule with four pairs of setae: one pair frontal, two pairs supraorbital, and one pair medial, posteriorly on frons; labrum with six setae near anterior margin, those at sides being longer; mandible with one setae in scrobe; labium with one pair paramedially, near base of tooth, and two pairs on lateral lobes; prebasilar with two pairs of setae.

Pronotum (Fig. 1). In form, quadrangular, as long (0.31-0.32 mm) as wide (0.32 mm). Posterior margin (0.24-0.25 mm) narrower than anterior margin (0.29-0.30 mm). Hind angles acute, dentiform, preceded by several blunt crenulations (only visible at high magnification). Anterior and posterior margin with row of tomentum-shaped setae. *Pronotal chaetotaxy*: with two pairs of lateral marginal setae (one pair near hind angles, and other pair in anterior 1/5).

Elytra (Fig. 1). Length from humerus to apex 0.63-0.64 mm; maximum width 0.33-0.34 mm. Lateral margins slightly serrate except in apical region. Two minute teeth (one tooth on each elytral apex) at apical margin, near end of longitudinal carinae at seventh stria. *Elytral chaetotaxy*: umbilicate series in two groups (humeral group of four setae, second seta very long; subapical group of three setae, first and third very long); apex with three pairs of setae.

Legs (Figs 3-5). Prothoracic and mesothoracic legs (Figs 3-4) typical for *Typhlocharris*, without special features. Hind leg (Fig. 5) as specified, above (diagnosis).

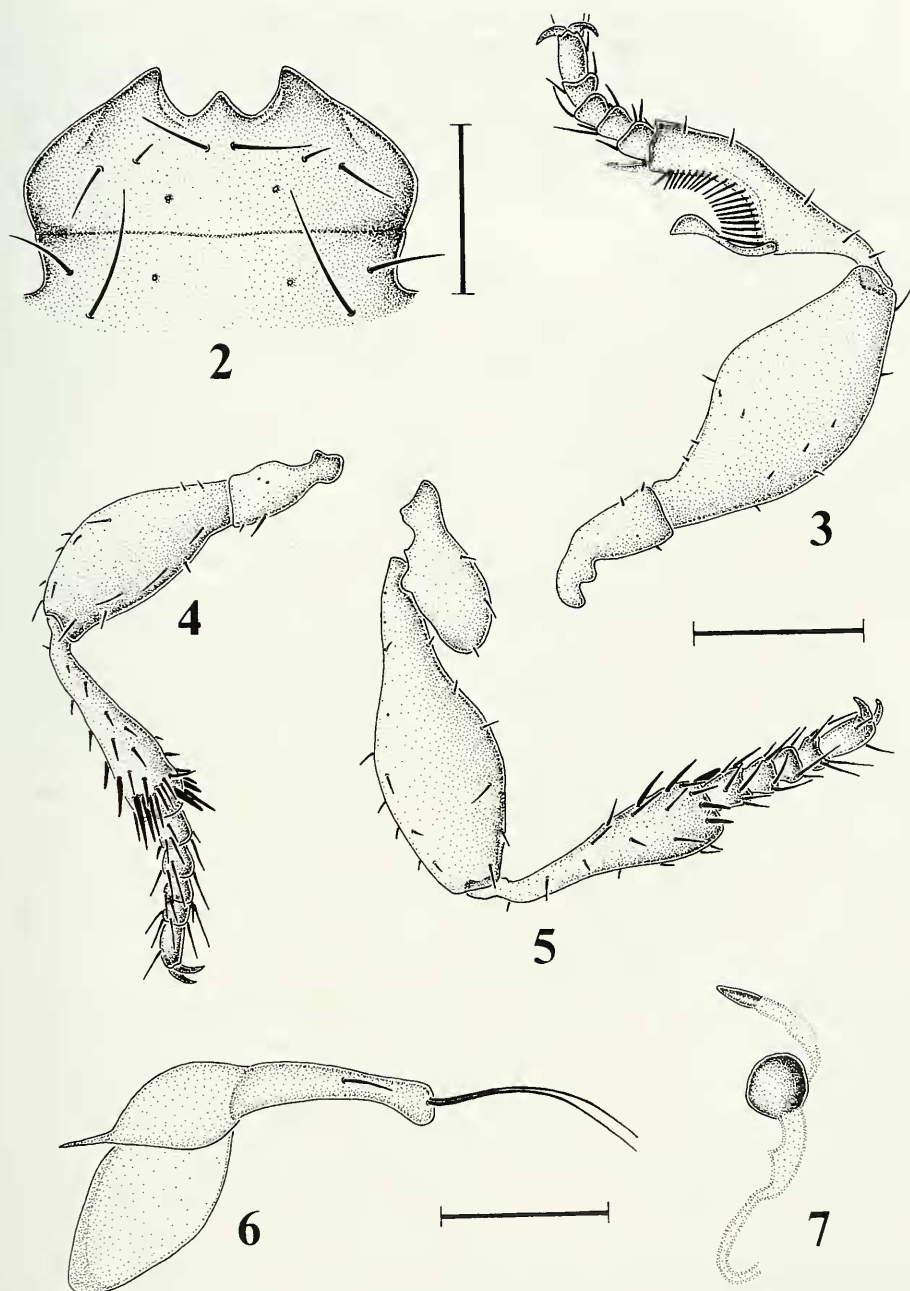
Female genitalia (Figs 6-7). Genital shield (= external genitalia) (Fig. 6) with gonopods (gonocoxite IX and gonosubcoxite IX) dimerous; gonosubcoxite IX subtriangular, with line of articulation with gonocoxite IX barely perceptible; gonocoxite IX long and cylindrical, near apex with two long nematiform setae, and on ventral surface near middle single short seta (probably ensiform). Laterotergite IX aliform. Internal genitalia with spermatheca (Fig. 7) in diameter 18-20 μm , subspherical and markedly sclerotized; duct of spermathecal gland short, gland fusiform, apical portion sclerotized.

Male not known.

Etymology. This new species is dedicated to my friend Dr Gonzalo Pérez Suárez from the Departamento de Zoología y Antropología Física de la Universidad de Alcalá (Spain).

BIOLOGY

Like other Anillini, this species is endogaic. The specimens were located in B-horizon soils, besides a run-off water ravine in a Mediterranean forest dominated by old reafforestation pines. Autochthonous plants as holm oaks, wild olive-trees and carob-trees appear near the river bank. The substrate is calcareous and the clayey soils, of brown reddish colour, are profusely invaded by small roots of plants. The accompanying entomofauna was very diverse, including Gamasida and Oribatida (Acari), and Collembola, Diplura, Ponerinae ants, and Coleoptera (Hexapoda). Among the beetles there were a few specimens of other endogaic species: two Anillini of the genus



FIGS 2-7

Morphology details of *Typhlocharis gonzaloi* sp. n., female (ventral view): 2, labium and pre-basilar piece; 3, prothoracic leg; 4, mesothoracic leg; 5, metathoracic leg; 6, genital shield; 7, spermatheca and spermathecal gland. (Scales: 0.1mm).

Microtyphlus Linder, 1863, Leptotyphlinae (Staphylinidae), Anommatidae and Scydmaenidae. Geographically separated from the ranges of the other species of *Typhlocharis*, *T. gonzaloi* sp. n. is sympatric with two following species of Anillini of the genus *Microtyphlus*. For *M. torressalai* Coiffait, 1958, its type locality (Coiffait, 1958) is the same as for *T. gonzaloi* sp. n. For *M. canovasae* Toribio & Beltrán, 1993, the Alicante locality is new (Toribio & Beltrán, 1993), thereby constitutes a range extension for this species.

MORPHOLOGICAL AFFINITIES

T. gonzaloi sp. n. belongs to the *T. diecki*-group (*sensu* Zaballos & Ruiz-Tapiador, 1997), which is distinguished by the following morphological features: lack of a tooth on clypeus, umbilicate series in 4+3 formula and elytral apex with 4 teeth maximum. Currently, this group includes 5 species: *T. diecki* Ehlers, 1883 (Navarra, Zaragoza); *T. santschii* Normand, 1916 (Sahel-Tunisia); *T. besucheti* Vigna-Taglianti, 1972 (Sierra Nevada); *T. carmenae* Zaballos & Ruiz-Tapiador, 1995 and *T. farinosae* Zaballos & Ruiz-Tapiador, 1997 (Montes de Toledo).

The impossibility of obtaining more specimens (field work during six years), especially one male, makes it difficult to use distinguishing features such as different part of the aedeagus. However, in addition to geographic criteria, there is good evidence to support that these two specimens found in Alicante are unknown for science.

The shape of the elytral disk is one of the main differences between *T. gonzaloi* sp. n. and *T. carmenae*. On each elytron of *T. carmenae* females there is a large pit (Zaballos & Ruiz-Tapiador, 1995), our new species lacks any special features. Additionally, *T. carmenae* has one tooth on each elytral apex, close to the suture, but this feature is absent in *T. gonzaloi* sp. n. Another significant feature that differentiates both species is the shape of the legs, specifically in the femora and metathoracic trochanters of the females: on *T. carmenae*, the trochanter is very long and narrow, but the femur is normal, conversely, on *T. gonzaloi* sp. n. the trochanter is shorter and pyriform, the most common shape on this genus, but the femur shows an abnormal narrowing in its basal third (femur clavate).

The number of dentiform projections on the elytral apex is a very important feature that differentiates *T. gonzaloi* sp. n. from *T. farinosae*, because the latter has two pairs of teeth, one of them close to the suture. Additionally, there are important differences in the female genitalia: in *T. farinosae*, the gonocoxite is long and gracile, and has one ventral seta, one apical nematiform seta and a spermatheca consisting of an egg-shaped spiral tube (Zaballos & Ruiz-Tapiador, 1997). Conversely, *T. gonzaloi* sp. n. has a more robust gonocoxite that is enlarged at the apex, where two long nematiform setae insert. Moreover, in *T. gonzaloi* sp. n. the ventral seta is close to the middle of the piece, but in *T. farinosae* the ventral seta does not reach the middle and is closer to the basal edge (see figure). Additionally, in *T. gonzaloi* sp. n. the spermatheca is spherical. The position of the dentiform projections on the elytral apex is the most interesting difference between *T. gonzaloi* sp. n. and *T. besucheti*. Both species have one tooth on each elytral apex, but on *T. besucheti* it is placed one on each side of the suture (Vigna Taglianti, 1972) while in *T. gonzaloi* sp. n. it is placed as a prolongation of the longitudinal carinae of the elytron. Moreover, Vigna Taglianti (1972) does not



FIG. 8

Map of the *Typhlocharis diecki*-group species distribution.

describe any sternal pit on *T. besucheti* females, but this feature can be found in the new taxon here described.

The body shape and the pronotal proportions are the most remarkable differences between *T. gonzaloi* sp. n. and *T. santschii*. The species from Tunisia has parallel-sided elytra (without any arching) and a pronotum twice longer than wide (Jeannel, 1963). On the other hand, the new species has quite different features.

Finally, in order to obtain an exact differentiation between *T. diecki* and *T. gonzaloi* sp. n., it is necessary to know more accurately some other features of *T. diecki*,

like the female genitalia or the shape and proportions of the leg segments (especially trochanters and femora). However, there are some remarkable size differences between *T. gonzaloi* sp. n. and *T. diecki* (1-1.1 mm. long, according to Zaballo, 1986). This dissimilarity, added to the general body shape and the endemic character of these species, proves that *T. diecki* and *T. gonzaloi* sp. n. are specifically distinct.

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